

GROWING NATIVE FERNS OF THE NORTHERN TERRITORY

By Suzanne Avery and Alan Wade

The variety and attractiveness of native ferns makes their incorporation into a native garden well worthwhile. The majority are readily cultivated. According to distributions of ferns documented by Jones and Clemesha (1976), there are about forty five species represented approximately twenty nine genera in the Northern Territory. Chippendale (1971) reports fifty two species of which thirty eight are found in Darwin-Gove area.

Many ferns will grow at least as well under cultivation as in their natural state provided they are supplied with an organic fertilizer and are regularly watered. Some drought resistant ferns such as the basket fern (*Drynaria quercifolia*) and the rock fern (*Cheilanthes tenuifolia*) respond well to watering and commence active growth before they would do so naturally. Most ferns, however, are restricted to permanently wet areas and commonly grow year round. Ferns appear to reach their greatest diversity on rainforest margin. For example, in some localities around the Finnis River, it is not unusual to find six or seven species within a half kilometer radius. Other ferns grow in open soaks, in moist gullies or in almost purely aquatic habitats.

Propagation of ferns from spores is often difficult. This is due in part to the complex life cycle of the fern. A spore first develops to form a delicate prothallus: a young fern develops when the prothallus is fertilised. In practice, spores from adult ferns must be viable, moist conditions are required at all times and sterile culture media are a pre-requisite for the successful culture of a single species. One fern that is readily propagated from spores is the common wedge fern (*Lindsaea ensifolia*). Young adult ferns appear within six months under adult ferns provided conditions are fairly moist.

A number of ferns may be propagated by rhizome (stem) division. The climbing swamp fern (*Stenochlaena palustris*), the northern kangaroo fern (*Miscosorum scolopendria*) and the creeping swamp fern (*Cyclosorus interruptus*) have vigorous long creeping rhizomes that make

them obvious and candidates for propagation by simple division. Ferns that grow in clumps are also readily divided. Perhaps the best example of natural rhizome division is found with the northern swamp fern (*Blechnum orientale*). It grows in large dense clumps in well drained spring fed swamps. A single plant placed in a large pot developed five independent plants with separate root systems in a little over a year. Other examples include the common wedge fern (*Lindsaea ensifolia*), the hay-rake fern (*Dicranopteris linearis*), the attractive snake fern (*Lygodium microphyllum*) and the mangrove fern (*Acrostichum speciosum*). The basket fern (*D. quercifolia*) colonizes rocky outcrops and large tree trunks and can be readily grown from a small section of its massive fleshy rhizome.

Climbers and ferns with large leaves should be trimmed back fairly well when they are transplanted. This reduces water loss by minimizing transpiration through their leaves. Ferns have remarkable regenerative capacity provided the plants have the maximum opportunity to re-establish their root systems. Pruning and watering are the main requirements for successful transplanting of fern

ECOLOGICAL CONSIDERATIONS

The majority of Northern Territory ferns are restricted to perennial soaks. Basket and pot culture are made easy by rigging up a simple watering system such as trickle irrigation under the eaves. Garden soaks can be easily established in a protected area, for example under a low spreading tree, using spray or drip units to stimulate waterfall misting or rainforest environments.

Like most native plants, ferns are susceptible to fertilizer burn. A safe approach is to use a foliar spray of one of the many mild organic preparations or, in the garden, a light dressing of blood and bone or washed seaweed.

Apart from the very basic requirements of watering and regular feeding, a recognition of the particular ecological niche of individual species

provides additional clues for the successful cultivation of ferns. Most ferns and particularly those of the arid zone and seasonal monsoon region are restricted to very well protected areas. Ferns growing in protected positions are less susceptible to wind burn. Those species found in relatively exposed positions in open woodland grow better where there is some shelter from wind or where there is deeper moist soil to protect the fern root systems from desiccation. Notable exceptions are the mangrove fern (*Acrostichum speciosum*) and the freshwater mangrove fern (*Acrostichum aureum*). Both will stand up to wind, full sun and salt spray. *A. speciosum* is notable in that it will tolerate saltwater inundation. While a few species resent shade, most do not and have good potential as indoor plants.

Climbing and epiphytic ferns

A few Northern Territory ferns have a climbing habit. The ability to climb confers ecological advantage over woody plants or other ferns in the competition on the ecological role of climbers in more detail. Climbing ferns may be distinguished from creeping ferns by their ability to climb a suitable support.



A fern that classifies better as a scrambler than as a climber is the hay-rake fern (*D. linearis*). In open soils it is a stunted plant often no more than two hundred millimetres high. However in moist protected gullies it adopts a scandent habit climbing over itself to a height of two to three metres. The fern is sometimes slow to establish itself under cultivation but responds well to soaking and regular fertilizing. It quite readily adopts the natural scrambling habit either in a

basket provided with a support for the fern to grow against or in a well shaded and protected garden soak in deep mulch.



The climbing swamp fern (*S. palustris*) is the most vigorous of all Northern Territory ferns. It ascends its support by means of its rhizome which it twines around the trunks of larger trees. It is common on rainforest margin where it may blanket the forest edge up to the canopy and run along freshwater creeks for thirty metres or more. Provided ample water is available, the plant will spread to give good ground cover and climb to provide an interesting feature on a tree. In well watered baskets and pots, the fern rapidly outgrows its container. Water availability appears to be the limiting factor in determining the rate of growth of this fern under cultivation. It is hardy once established.

The very attractive snake fern (*Lygodium microphyllum*), serpent fern (*Lygodium japonicum*) and dragon fern (*Lygodium flexuosum*) twine around their support by means of their primary rachises (stems). In the serpent fern relatively few rachises arise from the rhizome. Each rachis branches extensively and the plant thus has the ability to mass attractively over low vegetation while showing little undercanopy growth. In contrast the snake fern produces a large number of leaf stems on its rhizome and a vertical screening effect is produced for heights of up to four or five metres. The snake fern is found in boggy situations on rainforest margin or on open swamp margin in semi-shade or full sun. It is a particularly common and attractive fern. The serpent fern, while both much less common and less vigorous, is also an extremely attractive fern and is well worth growing. Under cultivation

it can be grown in full sun or in shade, for example well under the eaves. Its habitat includes moist creek banks where its roots are well protected.

The dragon fern shares the growth habits of both the snake fern and serpent ferns. It can form both delicate curtains as well as massing over low shrubs or climbing trees to heights of four metres. We have found it growing on moist shallow soils, notable in shaded rock crevices in coastal rainforest.

Snake ferns, serpent ferns and dragon ferns grow well year round, but all have a high water requirement and all are particularly sensitive to fertilizer burn. The ferns have highly decorative scalloped fertile leaves and simple sterile leaves. Leaf form in the dragon fern is remarkably variable, young leaves are quite unlike older leaves and both sterile and fertile fronds show considerable variation depending on their location on the frond. It is certainly the most ornate of the climbing ferns found in the Northern Territory. That the snake fern is the most sun loving of the species is reflected in the fact that it will only develop fertile leaves in full sun. The serpent fern and dragon fern develop both leaf types in full shade.

The basket fern (*D. quercifolia*) has a thick fleshy rhizome which has enabled it to adapt to desiccating conditions. Like the ferns in the *Lygodium* genus, this fern has two very different leaf forms, broad nest leaves and lobed fertile fronds with conspicuous spore-bearing sori on their undersides. Persistent nest leaves trap debris providing fern with humus and nutrients as well as providing protection of the roots and rhizome against desiccation. Decaying vegetable matter such as leaf mould and banana skins help the fern to grow well under cultivation. The basket fern is an adaptable plant taking well to tree trunks, slabs and to hanging baskets, attaching itself to its support by means of roots. It takes at least several months of active growth for the fern to attach itself permanently to its support so initially it needs to be well tied up.

This very handsome fern is found naturally either as an epiphyte on tall monsoon rainforest trees or as a lithophyte on rockfaces. While the fern is sometimes found on rocky outcrops in open forest, it appears to be more common in and around rainforest.

GROUND DWELLING FERNS AND FERN ALLIES

Ground dwelling ferns are largely restricted to

bogs and soaks. Notable examples of ferns that can withstand long dry periods are the braid fern (*Platyzoma microphyllum*) and about eight species of *Cheilanthes* including the rock fern (*C. tenuifolia*). The rock fern is the only dry country species that can be readily cultivated in the Darwin area. It occurs occasionally in moist rock face crevices. We conclude this from our own experience and from records of attempts to cultivate drought resistant ferns found in the Northern Territory (Jones and Clemesha, 1976).



An introduced fern (*Pityrogramma calomelanos*), common around Darwin, is readily confused with the rock fern (Dunlop, private communication). It is easily distinguished from the rock fern however, unlike the rock fern, it has a silvery powder on the underside of mature leaves. Its success in invading native habitat can be attributed to the fact that it grows readily from spores and from our observation that it appears to occupy the same ecological niche as the rock fern.

In contrast ground dwelling ferns from permanently moist habitats are readily transplanted. The situations in which strongly water dependent ferns may be found is quite variable. The flowering fern (*Helminthostachys zeylantica*) appears to prefer well shaded moist soaks and has been found growing in almost pure laterite and on black soil clays adjacent to permanent swamps. The mangrove fern (*A. speciosum*) tolerates salt-water inundation and grows in association with landward mangroves or in moist rock crevices, while the protracting fern (*Ampelopteris prolifer*) grows on poorly consolidated sand bars in creek beds. This diversity of habitat type lends considerable scope for innovation in selecting aspect and the medium in which to grow ferns.

Of the forest ground dwelling ferns, the branched comb fern (*Schizaea dichotoma*) appears to be one of the few species to be found in isolated clumps. We have found groups of two or three plants growing in association with larger plants such as the carpentaria palm (*Carpentaria acuminata*) in rainforest. To date we have not been able to cultivate this fern, though one specimen survived for about eight months in a fairly open position.

The creeping swamp fern (*Cyclosorus interruptus*) provides one of the most striking and attractive ground covers found in Northern Territory bushland. It can be found in almost pure stands in well shaded permanent soaks. However in open swamps or on swampy creek margins it tends to grow poorly in competition with other ferns and grasses. We have established the fern in nearly full shade and in a garden soak. Its natural spread to open lawn has been slow so we have planted shade trees to facilitate establishment of the fern over a wide grassed area. Like the climbing swamp fern (*S. palustris*), this species has a vigorous habit under good conditions and soon outgrows a basket or pot. Leaves of the creeping swamp fern have prominently toothed margins and the highly attractive pale green fronds stand erect from the creeping and much branched rhizome. Older sections of the fern die off suddenly but new growth is unaffected.

Another creeping species that grows in natural shaded soaks or moist rocky areas is the northern kangaroo fern (*Miscrosorium scolopendria*). It is one of the best species for growing in baskets and pots in shade. Under these conditions the fern remains healthy and does not outgrow its container. However, it is slow to establish in open garden situations, though once established it spreads quite rapidly.

The range of the northern kangaroo fern extends from north-eastern Queensland to north-western Western Australia (Jones and Clemesha, 1976). We believe that the Top End of the Northern Territory probably represents one extreme of its range. The adaptability of this fern under cultivation is a reflection on its hardiness and from the degree of control that can be exercised over its growth.

Other ground dwelling forest ferns are also readily established. The swamp ferns of the *Blechnum* genus usually grow on rainforest margin or in tall paperback swamps together with other ferns such as the fishbone fern (*Nephrole-*

pis obliterata) and the snake fern (*L. microphyllum*). The native lasiandra (*Melastoma polyanthum*) is also common in these associations. The swamp fern and fishbone fern compete for space and usually one species predominates. When planted together, the northern swamp fern (*Blechnum orientale*) and the fishbone fern form an interesting contrast. The fishbone fern has much paler green leaves. It is difficult to grow the northern swamp fern as well as it can grow in swamps. Leaf size is much smaller and the fern is subject to wind burn and dies back whenever its high water demand is not met. Flooded pot holders remove a potential water stress problem. The native fishbone fern grows at least as well as exotic *Nephrolepis* species and has a much lower requirement for water than other swamp dwelling ferns. It grows best in a moist protected location, but is hardy enough to grow in an open garden situation.



Other hardy species include the two local representatives of the *Acrostichum* genus. They grow naturally in open swamps or soaks and will tolerate stagnant water. The freshwater mangrove fern (*A. aureum*) is a large and vigorous fern which rapidly becomes potbound. Both ferns become established rapidly and the mangrove fern (*A. speciosum*) soon forms attractive thickets. Jones and Clemesha (1976) have suggested that these ferns resent disturbance. We attribute their ready establishment to pruning of all fronds at the time of transplanting and to a regular watering programme.

The discovery of the broad shield fern, (*Lastreopsis tenera*), on the Lamaroo Beach scarp represents an extension of known range for this species. It was previously known from north

Queensland and is widespread throughout Asia. The fern has large attractive lacey fronds and takes readily in a fairly shadey garden soak.

Two fern allies locally common, *Lycopodium cernuum* and *Selaginella ciliaris* are more readily established than is often claimed by local gardeners. Major requirements during the establishment stage are moist shaded conditions and ample leaf mould placed around their roots. They are best established in pots or in a wind protected area in a carefully selected garden soak.

Of the aquatic ferns, the genus *Marsilea* is the best represented in the Top End of the Northern Territory. The four leaf clover fern (*Marsilea mutica*) is found on the margin of lagoons in semishade. The rhizome is long creeping and section of the fern become established immediately in a floating situation in shade.

The challenge to the naturalist in cultivating native plants is to replicate natural conditions. Ferns have adapted and become more restricted in their distribution over millenia in which aridity has gradually increased. Most species are restricted to the few small and permanently moist habitats that exist locally. Recognizing the special characteristics of these habitats is invaluable in the successful cultivation of native ferns.

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SPECIES	COMMON NAME	HABITAT	PREFERRED ASPECT	CULTIVATION	WATER REQUIREMENT	FERTILIZER RESPONSE	COMMENTS
<i>Acrostichum aureum</i>	freshwater mangrove fern	freshwater swamps or soaks above high tide mark	full sun	pot or garden	high	good	large fern, young fronds attractive, rapidly outgrows pots
<i>Acrostichum speciosum</i>	mangrove fern	landward aspect of mangrove communities subject to saltwater inundation	full sun	pot or garden	high	good	spreading fern, hardy, requires vigorous pruning to encourage new growth
<i>Ampelopteris prolifera</i>	protracing fern	sandy creek beds	full sun or semi shade	basket or pot	high	fair	uncommon, long trailing fronds
<i>Blechnum indicum</i>	swamp water fern	behind dune rainforest margin	full sun or semi shade	unknown	high	unknown	similar in appear- ance to northern swamp fern
<i>Blechnum orientale</i>	northern swamp fern	rainforest margin soaks	full sun or semi shade	pot	very high	fair	handsome fern with large fronds
<i>Cheilanthes tenuifolia</i>	rock ferns	sandy areas in open forest, rocky gullies	full sun or semi shade	basket, pot or garden pot	low	fair	very common hardy fern, easy propagated
<i>Cyclosorus interruptus</i>	creeping swamp fern	soaks in shaded forest or open swamps	shade or filtered sunlight	basket, pot or garden soak	very high	low	attractive toothed pale green leaves, spreads rapidly in shade
<i>Dicranopteris linearis</i>	hay rake fern	open soaks or moist gullies	full sun or semi- shade	basket or garden soak	high	excellent	fairly common attractive open fronds, requires fertilizing
<i>Drynaria quercifolia</i>	basket fern	forest trees and rocky outcrops	full sun or semi shade	garden trees, slab, basket	low	fair, requires humus	common, hand- some epiphyte, dormant during dry season
<i>Helminthostachys zeylacia</i>	flowering fern	moist shaded areas in heavy soil	shade	pot or garden soak	high	low	spores produced on flower-like frond
<i>Lastreopsis tenera</i>	broad shield fern	shaded protected moist rocky outcrops	semi shade	pot or garden soak	high	unknown	uncommon, erect fern with lacy frond and hairy fems
<i>Lindsaea ensifolia</i>	common wedge fern	open soaks, moist rocky gullies	full sun or semi shade	basket, pot or garden soak	high	fair	very common, sometimes slow

<i>Lycopodium cernuum</i>	Queensland coral fern	freshwater swamp margin, freshwater creek banks	shade	large pot or garden soak	very high	fair	fern ally, simple branching fronds, slow to establish
<i>Lygodium flexuosum</i>	dragon fern	well drained moist rain-forest	shade or semi shade	pot or garden, requires trellis	high	unknown	extremely decorative climber, readily established
<i>Lygodium japonicum</i>	serpent fern	moist creek banks	shade or semi shade	basket or pot, garden, requires trellis	high	good, easily burnt	
<i>Lygodium microphyllum</i>	snake fern	open swamp or rain-forest margin	full sun or semi shade		very high	good, easy burnt	extremely attractive, climber potential indoor plant slow to establish
<i>Marsilea mutica</i>	four leaf clover fern	cooler shaded areas of lagoon margins, purely aquatic	shade or semi shade	flooded container or pond	grows only in water	unknown	attractive floating four lobed leaves in two tone greens
<i>Microrosarium scolopendria</i>	northern kangaroo fern	rainforest margin soaks and waterfall overhangs	semi shade		fairly high	fair	attractive creeping fern with erect lobed fronds
<i>Nephrolepis oblitterata</i>	fishbone fern	rainforest margin soaks	full sun or shade	pot, basket or garden	high	good	long handsome fronds, indoor or outdoor plant, outgrows baskets
<i>Platyzoma microphyllum</i>	braid fern	sandy areas in open forest	full sun	unknown	low	unknown	small highly divided attractive fronds, not successfully cultivated
<i>Schizaea dichotoma</i>	branched comb fern	forest	shade	difficult	unknown	unknown	difficult to maintain
<i>Selaginella ciliaris</i>	northern swamp selaginella	moist protected soaks on swamp margins	shade	mulched pot or garden soak	high	unknown	fern ally, small delicate plant with branching stems
<i>Stenochlaena palustris</i>	climbing swamp fern	rainforest margin	full sun	well watered pot or basket or garden soak	very high	good	very common, vigorous coarse climbing fern, good ground cover

Editor's Note.
Lastreopsis has not been recorded from the Northern Territory.